WHAT IS CLAIMED IS:

1. A road white line detecting apparatus, comprising:
    a CCD camera to photograph a road surface;
5   an edge image generating section that generates
an edge image from a road surface image photographed and
outputted by the CCD camera;
    a smear edge detecting section that detects edge
positions of a smear from a region of the generated edge
10 image which is determined on the basis of a previously
detected position of a white line on the road surface;
    a smear edge eliminating section that eliminates
smear edges corresponding to the edge positions of the smear
from the generated edge image; and
15 a white line detecting section that detects the
present position of the white line from the generated edge
image from which the smear edges have been eliminated.

2. A road white line detecting apparatus as claimed
20 in claim 1, wherein the smear edge detecting section
comprises: a smear edge candidate point detecting section
that sets a smear edge candidate point detection region
on a region of the generated edge image in which the
previously detected position of the white line is absent
25 to detect smear edge candidate points from the set smear
edge candidate point detection region; and a smear edge
verification section that sets a smear edge verification
region which abuts the smear edge candidate point detection
region and which is parallel translated from the smear edge
30 candidate point detection region in a reverse direction
to a charge transfer direction of the CCD camera to verify
the positions of the smear edges at which smear edge points
are located within the set smear edge verification region

on the basis of coordinates of the detected smear edge candidate points.

3.   A road white line detecting apparatus as claimed in claim 1, wherein the smear edge detecting section eliminates the smear edges from an internal of a white line search region into which the white line position detection section searches the present position of the white line when the detected positions of the smear edges by the smear edge detecting section is included in the white line search region.

4.   A road white line detecting apparatus as claimed in claim 2, wherein the smear edge candidate point detecting section comprises: a first threshold value calculating section that calculates a first threshold value to determine the smear edge candidate points on the basis of extreme values on edge accumulated values and average values thereon in the charge transfer direction of the CCD camera within the smear candidate point detection region; and a coordinate detecting section that detects coordinates of the extreme values of the edge accumulated values and the edge accumulated values at the extreme values which are equal to or larger than the first threshold value, the detected coordinates thereof being coordinates of the smear edge candidate points, and wherein the smear edge verification section comprises: a second threshold value calculating section that calculates second threshold values to determine the smear edge respectively corresponding to the edge accumulated values of the smear edge candidate points; and a smear edge position detecting section that detects the positions of the smear edges from the coordinates of the edge accumulated values with respect to the smear edge

verification region which are equal to or larger than their corresponding second threshold values.

5. A road white line detecting method, comprising:
    providing a CCD camera to photograph a road surface;
    generating an edge image from a road surface image photographed and outputted by the CCD camera;
    detecting edge positions of a smear from a region of the generated edge image which is determined on the basis of a previously detected position of a white line on the road surface;
    eliminating smear edges corresponding to the edge positions of the smear from the generated edge image; and
    detecting the present position of the white line from the generated edge image from which the smear edges have been eliminated.

6. A road white line detecting method as claimed in claim 5, wherein, when detecting the edge positions of the smear, setting a smear edge candidate point detection region on a region of the generated edge image in which the previously detected position of the white line is absent to detect smear edge candidate points from the set smear edge candidate point detection region and setting a smear edge verification region which abuts the smear edge candidate point detection region and which is parallel translated from the smear edge candidate point detection region in a reverse direction to a charge transfer direction of the CCD camera to verify the positions of the smear edges at which smear edge points are located within the set smear edge verification region on the basis of coordinates of the detected smear edge candidate points.

7.   A road white line detecting method as claimed in claim
5, wherein, when eliminating the smear edges from the
generated edge image, eliminating the smear edges from an
internal of a white line search region into which the present
position of the white line is searched when the detected
positions of the smear edges is included in the white line
search region.

8.   A road white line detecting method as claimed in claim
6, wherein, when detecting the smear edge candidate points,
calculating a first threshold value to determine the smear
edge candidate points on the basis of extreme values on
edge accumulated values and average values thereon in the
charge transfer direction of the CCD camera within the smear
candidate point detection region and detecting coordinates
of the extreme values of the edge accumulated values and
the edge accumulated values at the extreme values which
are in excess of the first threshold value, the detected
coordinates thereof being coordinates of the smear edge
candidate points, and wherein, when setting the smear edge
verification region, calculating second threshold values
to determine the smear edge respectively corresponding to
the edge accumulated values of the smear edge candidate
points and detecting the positions of the smear edges from
the coordinates of the edge accumulated values with respect
to the smear edge verification region which are in excess
of their corresponding second threshold values.

9,   A road white line detecting method as claimed in claim
8, wherein the CCD camera is disposed to photograph the
road surface in a vehicular forward direction, wherein the
smear edge candidate point detection region is a rectangular

region having four vertexes of PLH (LXn + Xoff, SYn), PRH
(RXn - Xoff, SYn + DY), PLL (LXn + Xoff, SYn + DY), and
PRL(RXn +Xoff. SYn + DY), wherein Xoff denotes an X-axis
directional offset value from a lowest point of left and
5   right previously detected white line positions expressed
as SLn (SLXn, SYn) and SRn (SRXn, SYn) and DY denotes a
movement distance in a Y-axis negative direction from the
two vertexes of PLH and PRH, denotes the number of white
line search regions, X-axis positive direction being
10   vertical to a Y-axis positive direction which is coincident
with the charge transfer direction of the CCD camera, and
the smear edge candidate point verification region has four
vertexes of PLH (LXn + Xoff, SYn), PRH (RXn - Xoff, SYn),
PLM (LXn + Xoff, SYn - DY), and PRM (RXn + Xoff, SYn - DY),
15   wherein the edge accumulated values are derived for
respective X-axis positive coordinate values within the
smear edge candidate point detection region, a positive
maximum value (Vpmax), a negative minimum value (Vmmin),
a positive average value (Ap), and a negative average value
20   (Am) for the respective edge accumulated values are derived,
first threshold values (TA1 and TA2) for the positive and
negative accumulated values are calculated as follows: TA1
= α * (Vmmax + Ap) and TA2 = α * (Vmmin + Am), wherein α
denotes a first predetermined value for the respective first
25   threshold values TA1 and TA2 to be interposed between a
road surface edge intensity and a smear edge intensity,
and the X-axis coordinate values (AXi) of positive extreme
values of the edge accumulated values which are equal to
or positively larger than the positive first threshold value
30   (TA1) and those of the negative extreme values of the edge
accumulated values (AXi) which are equal to or negatively
larger than the negative first threshold value (TA2) are
derived and the accumulated values (AVi) corresponding to

the extreme values which are equal to or positively or negatively larger than the positive or negative first threshold value (TA1 or TA2) are derived, wherein the second threshold value (TBi) corresponding to the individual edge

5   accumulated values are calculated in the smear edge verification region as follows: TBi = β * AVi, wherein β denotes a second predetermined value based on a statistical value of a ratio between the edge accumulated values in the smear edge candidate point detection region

10   and those in the smear edge verification region, and wherein the accumulated value (Bi) in the Y-axis positive direction is derived for the X-axis positive coordinate values (AXi) of the smear edge candidate points within the smear edge verification region and when any accumulated values (Bi)

15   are equal to or larger than the second threshold value (TBi), the corresponding X-axis coordinate values (AXi) are detected as the coordinate values of the smear edge positions.

20   10.   A road white line detecting method as claimed in claim 9, wherein when the X-axis coordinates (AXi) of the detected smear edge is present within one of the white line search regions (40), a value of " 0 " is written into a part of the white search region (40) which has diagonal vertices

25   expressed as (AXi - DX, SY_{k-1}) and (AXi + DX, SY_k), wherein k denotes an order number of the white line search regions and Y-axis coordinate values of the k-th number of the white line search regions are expressed as SY_{k-1} and SY_k.

30   11.   A road white line detecting apparatus, comprising:
         photographing means having a CCD camera to photograph a road surface;
         edge image generating means for generating an edge

image from a road surface image photographed and outputted by the CCD camera;

smear edge detecting means for detecting edge positions of a smear from a region of the generated edge image which is determined on the basis of a previously detected position of a white line on the road surface;

smear edge eliminating means for eliminating smear edges corresponding to the edge positions of the smear from the generated edge image; and

white line detecting means for detecting the present position of the white line from the generated edge image from which the smear edges have been eliminated.